

**Notice of Allowability**

Application No.

10/791,575

Examiner

Richard Edgar

Applicant(s)

LIANG, GEORGE

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an application filed on 02 March 2004 under 37 CFR 1.53(b).
2. ☒ The allowed claim(s) is/are 1-19.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 20050815.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Norman Friedland on 17 August 2005.

The application has been amended as follows:

#### ***In the Specification***

The paragraph beginning on page 1, line 10 has been replaced by the following:

This patent application relates to U.S. Patent Application No. 10/791,581 ~~the contemporaneously filed patent application entitled LEADING EDGE DIFFUSION COOLING OF A TURBINE AIRFOIL FOR A GAS TURBINE ENGINE~~ by the same inventor (Attorney Docket N1089) and commonly assigned to Florida Turbine Technologies, Inc. inasmuch as both inventions relate to cooled turbine blades and both inventions can be utilized together and is incorporated herein by reference.

On page 8, in line 3, "Fig 1. Is" has been changed to -- Fig. 1 is --.

On page 8, between lines 9 and 10, --Fig. 4A is a close-up view taken around a cell shown by section 4-4 of Fig. 2; -- has been inserted.

The paragraph beginning on page 8, line 18 has been replaced by the following:

While this invention is being described showing a particular configured turbine blade as being the preferred embodiment, as one skilled in this art will appreciate, the principals of this invention can be applied to any other turbine blade that requires internal cooling and could be applied to vanes as well. Moreover, the number of cells and their particular shape and location can be varied depending on the particular specification of the turbine operating conditions. The leading edge and trailing edge cooling configuration and technique are not apart of this invention and any well known techniques could also be utilized and as mentioned earlier the technique described in U.S. Patent Application No. 10/791,581 ~~the contemporaneously filed patent application entitled LEADING EDGE DIFFUSION COOLING OF A TURBINE AIRFOIL FOR A GAS TURBINE ENGINE, supra,~~ could equally be utilized.

On page 9, in line 10, the numeral "23" has been changed to -- 12 --.

On page 9, in line 11, the numeral "1" has been changed to -- a --.

The above changes to the specification include the addition of the assigned patent application number of Applicant's co-pending application in place of Applicant's description of said application; correction of typographical errors; and the insertion of a brief description of Fig. 4A.

***In the Claims***

3. (Currently amended) Means for cooling the pressure side of a turbine airfoil as chimed in claim 1 including additional cylindrical chambers extending in the chord-wise direction, each having an interconnecting passageway fluidly connecting adjacent cylindrical chambers to each other and said passageway being oriented tangentially relative to each of said adjacent cylindrical chamber to flow coolant therein and imparting thereto a swirling motion[[,]].

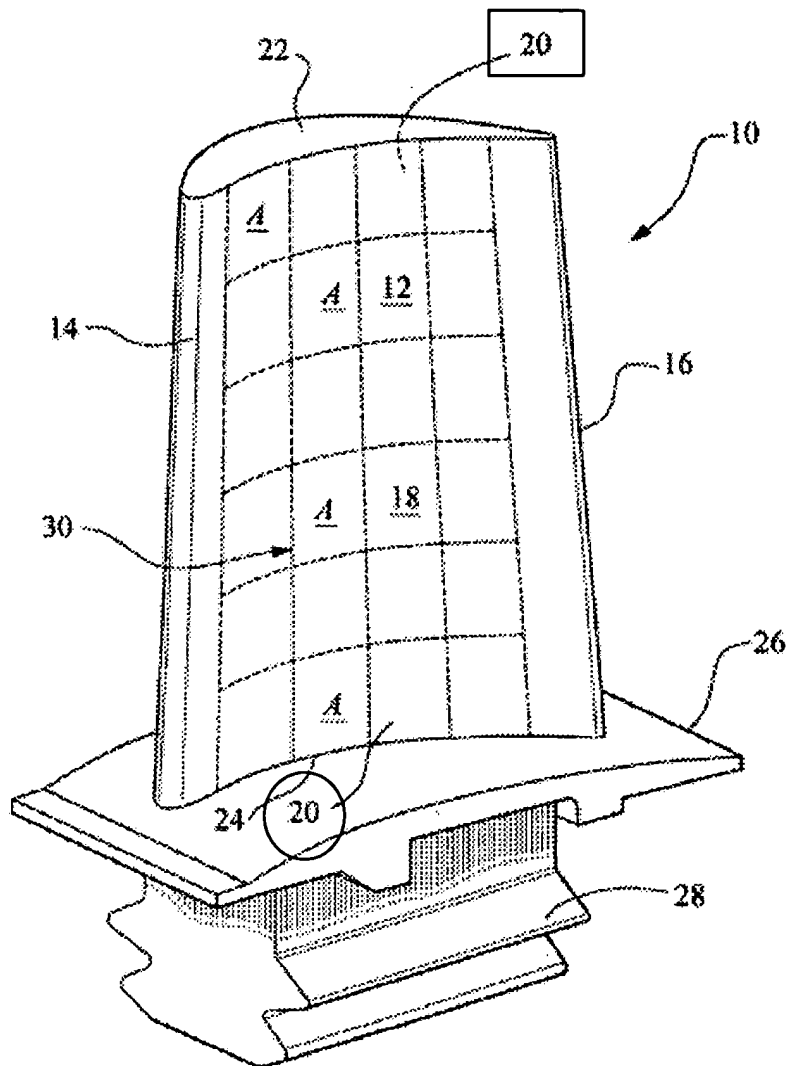
4. (Currently amended) Means for cooling the pressure side of a turbine airfoil as claimed in claim 3 wherein each of said passageways is staggered in the longitudinal direction relative to the passageways in adjacent cylindrical chambers.[[.]]

7. (Currently amended) Means for cooling the suction side of a turbine airfoil as claimed in claim 5 including additional cylindrical chambers extending in the chord-wise direction, each having an interconnecting passageway fluidly connecting adjacent cylindrical chambers to each other and said passageway being oriented tangentially relative to each of said adjacent cylindrical chamber to flow coolant therein and imparting thereto a swirling motion[[,]].

The above changes to the claims correct punctuation errors.

***Drawings***

The following changes to the drawings have been approved by the examiner and agreed upon by applicant:



***FIG. 1***

In Fig. 1 reproduced above, the numeral "20" shown in the box identifies the suction side, so the numeral "20" shown in the circle should be deleted.

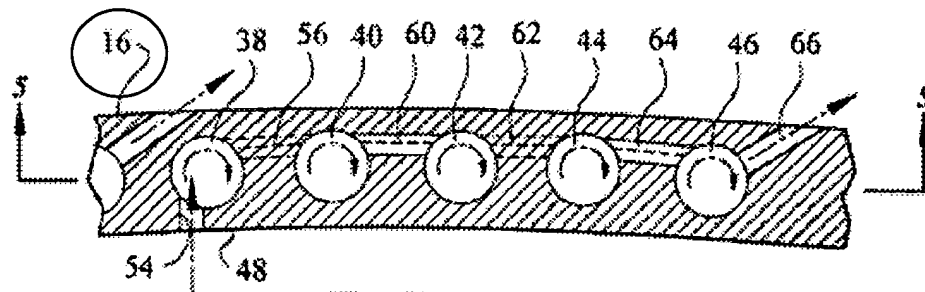


FIG. 4A

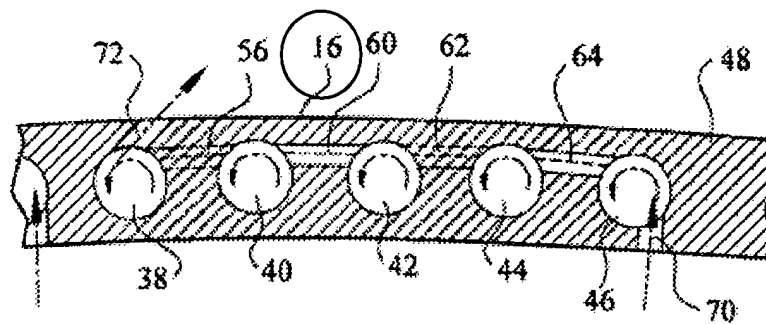


FIG. 4B

In Figs. 4A and 4B reproduced above, the numeral "16" (disclosed as a *trailing edge*) should be changed to "20" (disclosed as a *suction side*), commensurate with the disclosure.

In order to avoid abandonment of the application, applicant must make these above agreed upon drawing changes.

## **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

### **Replacement Drawing Sheets**

Drawing changes must be made by presenting replacement sheets which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments section, or remarks, section of the amendment paper. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). A replacement sheet must include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and within the top margin.

### **Annotated Drawing Sheets**

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheet(s) must be clearly labeled as "Annotated Sheet" and must be presented in the amendment or remarks section that explains the change(s) to the drawings.

### **Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may **NOT** be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

### ***REASONS FOR ALLOWANCE***

The following is an examiner's statement of reasons for allowance:

Each of the claims require a matrix formed by a plurality of cells extending in the longitudinal direction and the chord-wise direction, each of the cells comprising at least two cylindrical chambers.

United States Patent Application Publication No. 2001/0016162 A1 (Lutum et al.) shows a means for cooling an airfoil sidewall comprising a mid-chord passage 50, chambers 15, 21 spaced in the chord-wise direction and extending in the longitudinal direction being fluidly connected to the mid-chord passage 50, a first fluid connection 13 interconnecting the mid-chord passage 50 and one of the chambers 21, a second fluid connection 14 interconnecting the one of the chambers 21 and the other of the chambers 15, and a third fluid connection 16 discharging coolant from the other of the chambers 15 to the outer surface 11 (see Fig. 2).

United States Patent No. 4,669,957 (Phillips et al.) teaches a film coolant passage 50 in an airfoil sidewall being configured to create a swirling motion (see Fig. 3) of the coolant.

In the examiner's opinion, one having ordinary skill in the art would not have been motivated to combine the swirling motion chamber teachings of Phillips et al. to the sidewall teaching of Lutum et al., and then further define a matrix formed by a plurality of cells extending in the longitudinal direction and the chord-wise direction, each of the cells comprising at least two swirling motion chambers, since none of the



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references teach or fairly suggest a matrix. In fact, the references teach away from a matrix by teaching longitudinally extending cooling chambers.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (571) 272-4816. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7 am- 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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RE



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8/20/05